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(71) Applicants
Metabowerke GmbH & Co.,
Gerberstrasse 31,
D 7440 Nürtingen,
Federal Republic of Germany.
(72) Inventors
Albrecht Schnizler
(74) Agents
Saunders & Dolleymore,
Chartered Patent Agents,
2 Norfolk Road,
Rickmansworth,
Herts, WD3 1JH,
England.

(54) **A drill chuck**

(57) The drill chuck comprises clamping jaws 7 movable axially relative to a drill chuck body by a rotatable body 4 and a screw member 8, the clamping jaws being guided between a coned bush 1 and a guide member 2 which is provided with guides for the clamping jaws and is formed by at least one, e.g. three, correspondingly shaped metal sheet part 2'. The part(s) provides lateral surfaces acting as the guides. The part(s) has an external surface corresponding to the coned bore of the bush. The rear of the part(s) comprises a cylindrical portion clamped between bush and a support. The jaws are of T-section, mating with corresponding surfaces of the guide part(s).

Fig. 1

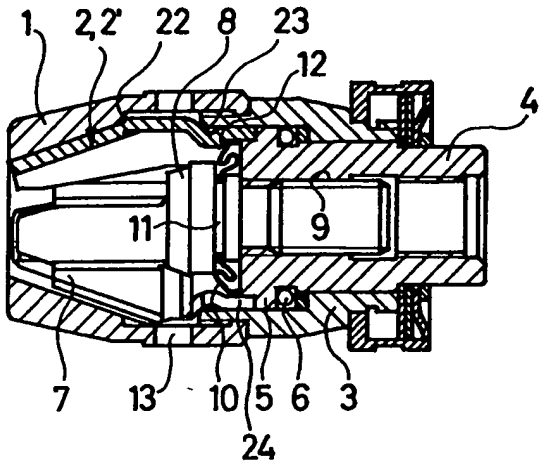

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Fig. 1

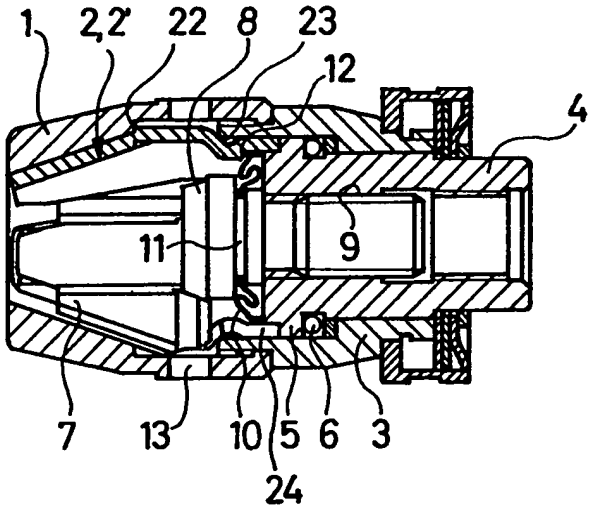


Fig. 2

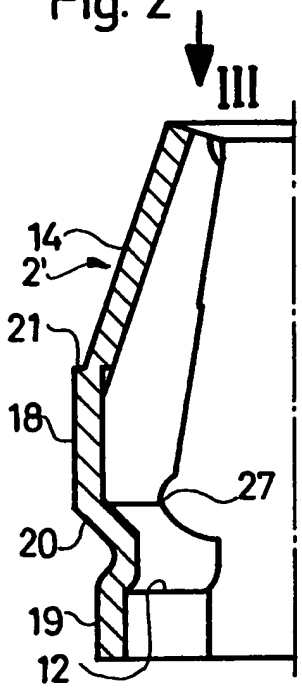


Fig. 4

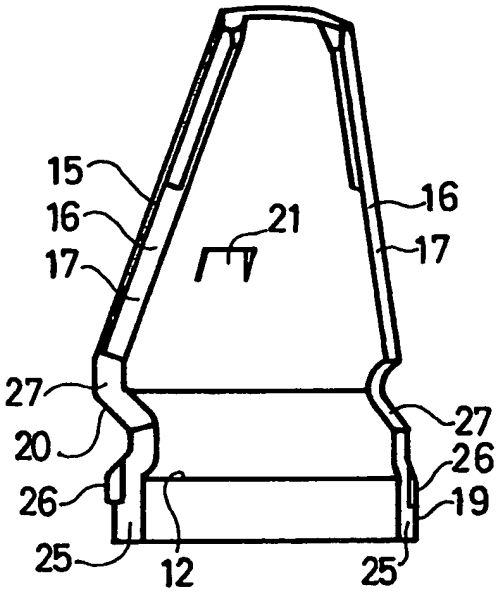


Fig. 3

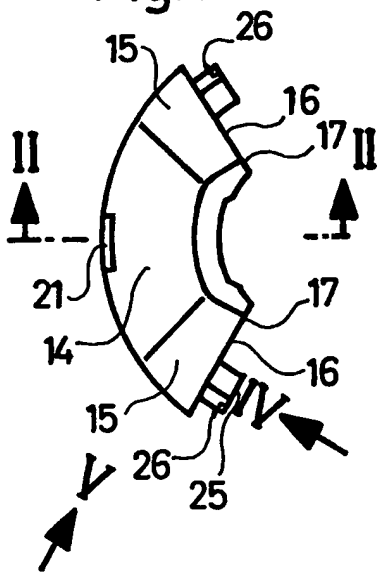
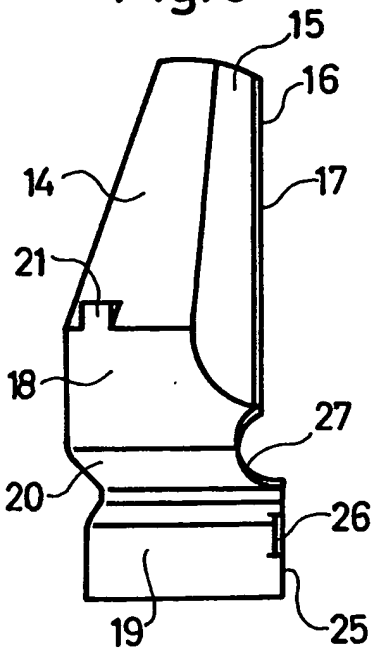


Fig. 5



SPECIFICATION

A drill chuck

The invention relates to a drill chuck comprising clamping jaws movable axially relative to a drill chuck body by a rotatable body and a screw member, the clamping jaws being guided between a coned bush and a guide member provided with guides.

In such a drill chuck known from DE-PS 1 810 614 the guide member is made by expensive drilling and milling from bar stock.

The aim of the invention is to avoid these disadvantages and to devise a drill chuck of the kind hereinbefore described in which the guide member is made rationally with savings in material.

This aim is achieved according to the invention in that the guide member is formed by at least one correspondingly shaped metal sheet part. The number of metal sheet parts provided corresponds preferably to the number of clamping jaws, so that normally there will be three parts. Each of the lateral edges of the metal sheet parts forms a guide for one side of a clamping jaw. The metal sheet parts approximately match the inner conical shape of the coned bush, the edges of the metal sheet parts, which form the lateral guides, being shaped to deviate from the conical shape and on them lies one arm of the clamping jaw, which is T-shaped in cross-section, or the edge of the metal sheet part engages into a lateral guiding groove of the clamping jaw, when the latter has a lateral guiding grooves. The metal sheet part is preferably held between the support and the coned bush, both the support and the coned bush having preferably an annular contact edge each, between which are held the metal sheet parts. Each metal sheet part can have at least one projection for bearing on to one of the contact edges. A particularly good mounting of the metal sheet parts ensuring their position can be achieved by an inwardly extending shoulder. The inner side of the inwardly extending shoulder can at the same time serve as an abutment for a seal, which may be provided inside the metal sheet parts at the end face of the screw member to protect the threads of the rotatable body and screw member against dirt.

A particularly good mounting of the metal sheet parts may be achieved in that they form at their end at the support in their assembled state a surface in the form of a cylinder of circular cross-section, the cylindrical surface being received between the support at the rotatable body and ending by its front face on an annular shoulder of the rotatable body, the rotatable body being guided in the support rotatably relative to the metal sheet parts.

The metal sheet parts are preferably prevented from rotation relative to the support, e.g. by projections extending towards the support.

The invention will now be described, by way of example, with reference to the accompanying diagrammatic drawings, in which:

Figure 1 is a section through a drill chuck having three clamping jaws,

Figure 2 is a section through the plane of symmetry of a metal sheet part,

Figure 3 is a plan view in the direction of the arrow III of the metal sheet part illustrated in section in Figure 2,

Figure 4 is a side view in the direction of the arrow IV of the metal sheet part illustrated in Figure 3, and

Figure 5 is a further side view in the direction of the arrow V of the metal sheet part illustrated in Figure 3.

The drill chuck illustrated in Figure 1 has a coned bush 1 and a guide member 2 which is composed of three shaped metal sheet parts 2'. The coned bush 1 is screwed together with a support 3 in which is rotatably mounted a rotatably body 4. The rotatable body 4 has an annular shoulder 5 which bears on to the support 3 via a thrust bearing 6.

Between adjacent metal sheet parts 2' is arranged a clamping jaw 7 in a manner known per se displaceably via a screw member 8, the latter being axially displaceable in the rotatable body 4 by means of a thread 9. The screw member 8 is prevented by the clamping jaws 7 from rotation relative to the guide member 2.

To protect the thread 9 from dirt, a bellows-shaped seal 10 is positioned between the screw member 8 and the rotatable body 4, the seal being held in a groove 11 in the screw member 8 and between the abutment 12 of the metal sheet parts 2' and the rotatable body 4.

The coned bush 1 has in its periphery holes 13 through which may be removed by centrifugal forces chips and dirt from inside the drill chuck.

The special form of a metal sheet part 2' is shown in Figures 2-5 in various views and a section. All three metal sheet parts 2' used in the embodiment shown by way of example are identical. The metal sheet part 2' has a conical surface 14 which matches the inner surface of the coned bush 1 and is along the outer edges bevelled to provide an inclined surface 15. The inclined surface 15 provides a guide 16 for one side of a clamping jaw 7, the clamping jaw 7 being in a known manner of a T-shaped cross-section and an arm of the T bears on to the inclined surface 15. The inclined surfaces 15 of the two metal sheet parts 2' in contact with each other lie alinged in one plane so that each clamping jaw is guided by the two surfaces provided by the inclined surfaces 15 and the lateral surfaces 17 displaced through 90° and finally also by the inner surface of the coned bush 1, altogether by five surfaces.

The assembled metal sheet parts 2' form together two cylindrical surfaces 18 and 19 of circular cross-section, which are separated from each other by an inwardly extending shoulder 20. The inner side of the inwardly extending shoulder 20 provides the abutment 12 for seal 10.

The cylindrical surface 18 is somewhat extended by a projection 21 in the centre of the metal sheet part 2'. This projection 21 and the inwardly extending shoulder 20 bear on to a contact edge 22 of the coned bush 1 and a contact edge 23 of the support 3, so that the metal sheet parts 2' are clamped between these contact edges 22 and 23.

The metal sheet surfaces 2' are further by their

ends, providing the cylindrical surface 19, held between a recess 24 in the rotatable body 4 and the inner surface of the support 3, in such a way that the rotatable body 4 is still rotatable in the support 3.

To prevent the metal sheet parts 2' from rotation relative to the support 3 a projection 26 is formed on each of the mutually abutting lateral surfaces 25 of the metal sheet part 2', which projection extends slightly outwardly and is hooked on the inner side of the support 3.

The lateral surfaces 17 merge in the region of the shoulder 20 via a recess 27 in the lateral surfaces 25. The recesses 27 are so arranged that they are approximately aligned with the holes 13 in the coned bush 1.

CLAIMS

1. A drill chuck comprising clamping jaws movable axially relative to a drill chuck body by a rotatable body and a screw member, the clamping jaws being guided between a coned bush and a guide member which is provided with guides for the clamping jaws and is formed by at least one correspondingly shaped metal sheet part.

2. A drill chuck according to Claim 1 wherein the guide member is formed by metal sheet parts, the number of which corresponds to the number of the clamping jaws, each of the lateral edges of the respective metal sheet parts having one said guide for one side of one said clamping jaw.

3. A drill chuck according to Claim 1 or Claim 2 wherein the outer surface or surfaces of the metal sheet part or parts at least approximately matches or match the inner conical surface of the coned bush.

4. A drill chuck according to Claim 1 or 2 in which the clamping jaws are of a T-shaped cross-section and have lateral guiding grooves, and in which the edges of the metal sheet parts, which provide the guides, have surfaces inclined from the conical shape and on each of them bears always one arm of one said clamping jaw, or each said edge extends always in a lateral guiding groove of one said clamping jaw.

5. A drill chuck according to any one of Claims 1 to 4 wherein the metal sheet parts are held between a support and the coned bush.

6. A drill chuck according to Claim 5 wherein both the support and the coned bush have annular contact edge each and the metal sheet parts are held between said two contact edges.

7. A drill chuck according to Claim 6 wherein each said metal sheet part has at least one projection for bearing on to one of the contact edges.

8. A drill chuck according to Claim 7 wherein the projection is formed by local stamping.

9. A drill chuck according to Claim 6 or 7 wherein an inwardly extending shoulder bears on to the contact edge of the support.

10. A drill chuck according to Claim 9 wherein the inner side of the inwardly extending shoulder serves as an abutment for a seal.

11. A drill chuck according to any one of Claims 5 to 10 wherein the metal sheet parts form at their end adjacent the support in their assembled state a cylindrical surface and this cylindrical surface is received between the support and the rotatable body and ends at its front face at an annular shoulder of the rotatable body the rotatable body being guided in the support rotatably relative to the metal sheet parts.

12. A drill chuck according to any one of Claims 5 to 11 wherein the metal sheet parts are arranged to be non-rotatable relative to the support.

13. A drill chuck according to Claim 12 wherein at least one of the metal sheet parts has at least one projection protruding against the support to prevent the parts from rotation.

14. A drill chuck according to Claim 13 wherein at least one said projection is provided on at least one of lateral surfaces in mutual contact of the metal sheet parts.

15. A drill chuck according to any one of Claims 1 to 14 wherein the lower ends of the edges of the metal sheet parts which edges provide guides for the clamping jaws end in a recess and the passage formed thereby is in correspondence with holes in the coned bush.

16. A drill chuck according to Claim 4 wherein both the inclined surfaces facing each other of two adjacent ones of said metal sheet parts are situated alinged with each other in one plane.

17. A drill chuck constructed, arranged and adapted to operate substantially as herein described with reference to, and as shown in, the accompanying drawings.

18. A drilling machine including a drill chuck according to any one of Claims 1 to 17.

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